**Gravitational Potential Energy Calculations**

1. Determine the gain in the potential energy when a 4.0 kg rock is raised 18.000 m.

2. A leopard with a mass of 55.00 kg climbs 12.0 m up a tree. What is its gain in PE?

3. An aircraft is taking a group of skydivers up into the air. Evan is dressed in his parachuting outfit, which brings his mass to a total of 90.0 kg. The aircraft takes the group to a height of 5000.00 m before the jump. How much PE does Evan gain before jumping?

4. An owl has a mass of 4.00 kg. It dives to catch a mouse, losing 800.00 J of its PE. What was the starting height of the owl, in meters?

5. An astronaut with a mass of 110.0 kg visits the moon (which has a different gravitational force than Earth). The astronaut climbs 5.0 m up the ladder into his spacecraft and gains 880.0 J in PE. What is the strength of gravity on the moon?

6. One of the tallest radio towers is in Fargo, North Dakota. The tower is 629.9 m tall. If a bird lands on top of the tower, so that the gravitational potential energy associated with the bird is 2033.76 J, what is its mass, in kilograms?

7. The largest sea turtle found in the United States had a mass of 860.24 kg. If the gravitational potential energy associated with the turtle as it was being lifted onto a ship was 20,320.7 J, how high above the water was the turtle when it was lifted?

8. The heaviest piece of equipment ever carried by an airplane was a 12,400.05 kg generator built in Germany in 1993. How far above the ground was the generator when the PE was 91,700,000.00 J?